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1. Latitude and longitude of the place.
 2. The date of the observation, giving exactly the year, the month, the day of the month, and the hour of the day.
 3. The observation itself exactly as made; if with a barometer or aneroid, the pressure to be given; if with a thermometer, the boiling-point to be given, and not merely its equivalent in pressure.
 4. The temperature of the air in shade.
 5. The weather for two days before and after the observation, showing the temperature of the air, its probable humidity as made known by the feelings or by its effects on surrounding objects, the amount of cloud, the rainfall, the direction, veerings, shifts, and force of the wind, together with any striking phenomena that may occur.
- To these might be added, if possible, observations of the wet-bulb thermometer.

It will be evident from these remarks that the physical geographer will require the practised meteorologist to aid him in settling the important physical problem of heights for large portions of the earth's surface.

6.—*Eastern Siberia and the Amoor.* By RONALD BRIDGETT, Esq.

THE following pages are written from personal observation and information derived on the spot during the autumn of last year.

Commencing with the most eastern portion of the vast Empire of Russia, we find the Pacific seaboard organised in 1858 as a separate Provincial Government, under the style of the Maritime Province of Eastern Siberia, and extending from the Corea in the south to Behring's Straits in the north, while inland it reaches Khabarofka on the Amoor in long. 155° E. The existing settlements in the south are at Possiet Harbour and Vladivostock (Port May), both forming capital anchorages, and the latter destined, ere long, to become the chief naval depôt of Russia in the Pacific, as the navigation is closed by ice for only two months in the year, while Nicolaievsk, the present rendezvous of the fleet, is difficult of approach, and frozen up for more than six months. The coast line of Manchuria is very mountainous, but inland towards the Lake Kinka and River Ussouri exist tracts of land capable of producing rich crops of grain. From Vladivostock a telegraph line exists by way of the Rivers Ussouri and Amour to the head-quarters at Nicolaievsk. Large game exists in numbers, and it is not uncommon to see three or four tigers at one time. A small station likewise exists at Port Imperial or Barracouta Bay in lat. 49° N. On the opposite side of the Gulf of Tartary, on the Island of Saghalien, Russia maintains one or two military posts, the one to the south was situated at Kussonei in lat. $48\frac{1}{2}^{\circ}$ N., and regarded as the Japanese frontier, but by a mutual understanding with the Japanese for the interchange of colonists, the Russians last summer made a commencement by sending down to Amioa Bay on La Perouse Strait a battery of artillery and a company of soldiers! A Russian post formerly existed at this place, but was withdrawn. The other station on Saghalien is at Doui, in lat. $50\frac{3}{4}^{\circ}$ N., three miles south of Jonquière Bay, nestling in a gap in the mountains, and not distinguishable from the sea, except by the lighthouse built on the hill above. It consists only of a few log huts and barracks for the soldiers employed to guard about 70 convicts of the worst class, murderers and others who are looked upon as beyond the pale of the law, and not subject to the same restrictions as regards personal chastisement as other criminals, four to five hundred lashes being the punishment awarded for a trivial offence. Here, as in other parts of Saghalien, coal is found on the surface, and the seams may readily be traced on the

face of the cliffs. The convicts are employed in working the coal and bringing it to the jetty for shipment. It is used by the Russian steamers navigating these waters, and was favourably reported on by the engineer of H.M.S. *Scylla* in 1866. The lumps are small, but crumble to pieces when exposed to the air, and its chief fault is said to be its mixture with dirt. Last year two vessels loaded cargoes for China. Very good sable-skins may be had here for ten roubles, or for a bottle of Hamburg brandy worth *one* rouble, which shows the little value of money.

A little to the north of Doui, on the mainland, is De Castries Bay, which is well protected by pine-covered hills, and offers capital anchorage for vessels of the largest class from May to November when not covered by ice. Vessels drawing more than twelve feet of water usually lighten here before proceeding to Nicolaievsk. It was here that, in 1855, the Russian squadron found shelter after the evacuation of Petropavlovski, but during a dense fog contrived to give Commodore Eliot the slip, while he was waiting outside for reinforcements. The post is occupied by about 200 soldiers living in log huts, and the remains of earthworks and fascines formed in 1855 are still visible. From De Castries Bay, proceeding north along the Liman and following a tortuous channel marked out by buoys, &c., the mouth of the River Amoor is reached. Twenty miles up the river, on the left bank, is situated the town of Nicolaievsk, consisting of wooden houses whose shingle roofs, coloured red and green, look picturesque in the sunshine. It is the head-quarters of the Russian navy in the Pacific, and as such the approach from the sea is defended by batteries. In 1854 there were only ten log huts, but now the population numbers upwards of 5000, consisting chiefly of military and convicts. There is a public garden where the regimental band plays on Sunday afternoons in summer, and also a public library and reading room—supplied with the principal European journals—and a club house, where during the writer's visit an excellent amateur concert was given for a charitable purpose, and, showing how Western refinement has extended even to this distant part of the globe; each lady was presented with a programme printed on white satin. The trade of the port, though free of all customs dues, is of no great extent, and consists mainly of imports from Hamburg and San Francisco, which arrive in six or eight vessels between May and October, and failing any exports but furs, the ships have to go away in ballast. In winter the cold is very severe, and all navigation ceases from November to May. The river at Nicolaievsk is about a mile across, and in summer is navigable for steamers of light draught a distance of 2000 miles from its mouth. At present ten or a dozen steamers are employed in Government service, transporting mails, passengers, and merchandize; in addition to these there are three or four private steamers. In winter communication is kept up along the frozen stream by post stations, at which horses and sledges are kept, and last year a Government courier made the journey to St. Petersburg, a distance of 6000 miles, in 30 days; but this is quite exceptional, as the winter post usually occupies 45 to 50 days.

Ascending the river in a steamer, and anchoring each night, Mariensk is reached in a couple of days; this was first occupied as a trading post in 1851, but Sofiensk, 20 miles higher up, is now preferred, and is occupied by a number of soldiers, whose barracks, a large house occupied by the Telegraph Administration, and a few scattered log-huts, constitute the settlement. From this place to De Castries Bay there is land-communication, the distance being only some 30 miles. Between Nicolaievsk and Sofiensk the river-banks are hilly, but in places they recede and long low islands abound. Three or four small Russian villages are passed, whose inhabitants cultivate a few patches of rye, oats, and vegetables. The latter, with milk and wild fruit, they dispose of to the steamers while stopping to wood. Bush fires appear very frequent in this neighbourhood, and mosquitoes swarm in myriads.

From Sofiensk to Khabarofka, a distance of 460 miles, the river-banks are in places hilly and wooded, while at times the stream divides into numerous channels intersected by water-meadows, from which the villagers secure a winter store of hay. Khabarofka is of some importance as a military station, and is situated on a cliff at the junction of the River Ussuri, which falls in from the south. Along the right bank of this stream a line of Cossack posts protects the Russian boundary. The telegraph wires, which had hitherto followed the course of the stream, here diverge, and extend to Vladivostock on the coast, but in another year communication with Europe will be complete, as the work is being proceeded with.

Continuing our progress past the mouth of the River Sungari, a large tributary, and for several days between low banks and through uninteresting country, the character of the scene changes suddenly after passing the village of Ekaterin-Nicolski, which, like others on this part of the river, and all on the left bank, consists of a line of log-huts facing the stream and occupied by Cossack soldiers and their families. The river here contracts to a quarter of a mile in width, and is hemmed in for a distance of 60 miles by lofty hills clothed from base to summit with mountain oak, white birch, and fir trees. This is known as the passage of the Hinghan or Bureya Mountains, and in places the current is so strong that it is with great difficulty that steamers can make progress. A more open country succeeds, with swelling woodland and park-like patches of grass, and, after passing several Manchour villages, the Chinese town of Aigun on the right bank is reached; but it offers no feature of interest, and, although of some size, consists only of wooden huts with mud walls, and a few joss houses or temples, while along the bank are ranged a dozen small brightly painted junks, constituting the Chinese fleet laid up in ordinary. Some 15 miles above Aigun, at the mouth of the River Dzeya, is Blagoveshchensk, in long. 137 E., the residence of the Governor of the district of the Amoor, and the largest town on the river with the exception of Nicolaievsk. It consists of two long streets, one of which faces the river, but the houses are rather far apart and irregular and all built of wood. The residence of the Governor is on one side of the Place d'Armes—of the future—as at present it is the resort of the stray pigs of the neighbourhood. A battalion of infantry is quartered here, and for the use of the soldiers a gymnasium has been erected, with the addition of appliances for practising the scaling of walls and earthworks, an example which might be followed with advantage in England. The country round is open moorland, and offers good pasturage for numerous cattle, which are sent down the river for sale on steamers or rafts. The chief trade of the place is conducted by the Manchours, who inhabit the village of Saghalién on the opposite bank, and return each night; like all Chinese they are good traders, but their exterior is very dirty. They bring flour, tea, tobacco, and bullocks for sale, and take payment in European goods, Mexican dollars and silver roubles, which are sent to Tsitsigar, a large town 100 miles to the south, there to be melted into “shoes” of silver, or Sycee.

On the River Dzeya are several villages inhabited by peasants from Russia belonging to religious sects not in communion with the Greek Church, who have been driven from their homes by persecution. The land they cultivate is very rich, and gives bountiful crops of grain, and the Government for the last two years has been a large purchaser for the supply of soldiers and others in less favoured districts on the Amoor.

Continuing our course up the Amoor we pass charmingly wooded hills rising from the water's edge, with here and there a bold rock to change the character of the scene. The stream is very tortuous, and in one place makes a circuit of 20 miles, and returns to within half-a-mile of the same spot. Wild geese and ducks are to be seen here in thousands, and afford excellent

sport, while bears and other large game may also be found in plenty. At 200 miles' distance from Blagoveshchensk a line of chalk cliffs are passed, known as the White Mountains, rising from the water's edge, and continuing for three miles. Beyond these, in three or four days, we come to Albazín, a large village distant halfway between Nicolaievsk and Strétensk. The church forms a prominent object, and is built on raised ground which was formerly a fort, and in the 16th century was successfully held by 300 Cossacks against an army of Chinese. The traces of numerous earthworks are still visible in the village and neighbourhood. At a distance of 80 miles to the north gold has been recently discovered, and is being worked at an extensive outlay by a capitalist of St. Petersburg, causing a large influx of miners and others last summer, and raising the prices of all provisions to an exorbitant rate. The gold is found in clayey soil after the removal from the surface of about 10 feet of black earth, and the produce is said to be very rich.

Some distance below Albazin a dangerous bar crosses the river, and in 1855 prevented the further ascent of the first Russian expedition up the river under the direction of Admiral Putiatin in the steam-launch *Nadeshda*. In the previous year General Mouravief headed the first military expedition down the river, conveying reinforcements with supplies and provisions for the garrisons in the Pacific, which were closely blockaded by the Allied Squadron. In the autumn of 1855 a party of 400 soldiers returning from De Castries Bay, also ascended the river in barges, and a sad history is related in connection therewith. Becoming frozen up, and unable to proceed by water, the men were divided into parties, and those leading deposited stores of provisions, as at that time there were no settlements on the river. The quantities and distances were wrongly calculated, and the parties following found diminished supplies at each place, and were reduced to the most horrible state of starvation, and not one-fourth of the whole party survived. Those who returned to assist their fellows found corpses with the flesh of their dead comrades, which they had not the strength left to masticate, still remaining in their mouths. The matter was hushed up for some time, and the persons to blame failed to receive their merited punishment. The chief culprit, subsequently Governor of Blagoveshchensk, is since dead.

Leaving Albazín, and after reaching the junction of the rivers Argun and Shilka, which unite to form the Amoor, we ascend the Shilka, both banks become Russian territory, and the passage of the Little Hinghan Mountains commences. For 120 miles very grand scenery prevails, and the only habitations visible in the dense pine-forests are seven post stations, till the village of Gorbitza is reached, and here the mountains begin to recede, fewer trees are seen, and the country shows signs of extensive settlement as we now are in Trans-Baikalia. Passing the village of Shilka, once the smelting-place for the silver ore found in the neighbourhood, Stretensk on the right bank is reached, and here steam navigation ceases, owing to the shallowness of the stream, although for barges it is navigable as far as Chetah. Steamers from Nicolaievsk ascend in summer in from 30 to 35 days, and descend in one-third the time. The ice at Stretensk breaks up from the 10th to the 15th of April, and pleasant summer weather ensues till about the middle of October, when frost and snow once more begin. Three miles above Stretensk the Russian Government has established workshops, in charge of an Englishman, for the repair and construction of steamers and barges, affording profitable employment to a number of convicts.

The colonisation of the Amoor was commenced on an extensive scale in 1858 and 1859, but it was not till 1860 that the full possession of the country was confirmed by treaty with China. Since that time villages have been established at varying distances, from 20 to 100 miles apart, along the whole length of the stream, from Ust Strelka at the junction of the rivers Argun and Shilka, to

Nicolaievsk at its mouth. This colonisation is in a great measure military, and to a certain extent artificial, and was only maintained at first by a vast expenditure of money, as supplies of flour and grain had to be imported by sea from Europe; and even now, in the spring of each year, supplies are sent down the stream from Trans-Baikalia for distribution to the military colonists. Matters, however, show an improvement, as the villages are beginning to be self-supporting, and from the neighbourhood of Blagoveshchensk large quantities of grain are now forwarded to other parts of the river. The progress is slow, and the great anticipations once formed have been materially reduced, as notwithstanding the inducements offered by Government, few peasants care to undertake so long a journey from Russia, often lasting a year or eighteen months; and Government has therefore mainly to rely upon soldiers, and time-expired convicts, who are scarcely likely to make good settlers.

The native inhabitants on the river, besides the Manchours and Chinese, are not numerous, and on the upper part consist of Oronchonee and Manyags, who wander from place to place, and live in birch-bark tents covered in winter with deer-skins. Below the River Sungari are the Goldi, who, like the Gilyacks at the mouth of the river, and along the coast, live in wooden huts clustered together, not deserving the name of villages. They are expert fishermen, and wear dresses made of fish-skin. With these latter tribes the bear is an animal looked upon with great reverence, and one is usually kept caged in each village till, on a certain day in the year, a great festival is held, and he is slaughtered and eaten with due ceremony.

Returning to Strétenks, where the post-road extending into Russia commences, we thence reach Nerchinsk, a straggling wooden town, without a tree visible in the neighbourhood and once the head-quarters of gold-mining, but having become exhausted, the mines are now worked more to the south and east. Following the course of the River Ingada, the road passes through a wild mountainous country to the town of Chetah, the capital of the province of Trans-Baikalia, and residence of the governor. It is a place of about 5000 inhabitants, and has increased very rapidly, as in 1855 it numbered only about 100 houses. There is a Government College, and among the students are several young Bouryats, who display great aptitude for acquiring modern languages. The Bouryats are the native inhabitants of this part of Siberia, and have the Mongolian type of features; the women wear their hair in two long plaits brought forward over each shoulder, and the men have short pig-tails. Many of the men act as drivers at the post-stations, but, as a body, they are nomadic in their habits, and possessed of large herds of cattle and flocks of sheep, which find excellent pasture in summer on the steppes. For want of an outlet, the wool is often left to rot on the backs of the sheep, but the merchants at Kiachta are now buying it where they can, and despatching it down the River Amoor for shipment at Nicolaievsk. At a village 20 miles from Chetah are located some 2000 Polish exiles, a number of whom, while at work in 1866 on a new road at the foot of the Lake Baikal, made their escape, but while disputing as to leadership were surrounded by troops and once more placed under surveillance.

After leaving Chetah the road crosses the Yablonoi range of mountains, and traversing the Bouryat Steppe we arrive at Veshni Oudinsk, a considerable town at the junction of the Rivers Oudah and Selingur. On the latter a steamer was plying for the first time last summer, bringing tea from Kiachta on the Chinese frontier to the Lake Baikal. The bulk of this overland trade is, however, carried on, according to the season, by one-horse carts or sledges, which travel fifty or sixty together in single file, and occupy from five to six months on the journey into Russia. Veshni Oudinsk is in telegraphic communication with St. Petersburg, and distant 70 miles by road from the village of Pasolsk on the eastern shore of Lake Baikal. This lake, although frozen in

winter, is quite an inland sea, and at times when there is a strong wind the steamer, a stout boat of 250 tons, belonging to the merchants of Irkutsk, which usually makes the passage twice a week in summer, is unable to cross. Indeed the storms on the lake rage so furiously, as to given rise to a Russian saying, that "it is only on the Lake Baikal, in the month of October, that a man learns to pray from the bottom of his heart." At Pasolsk is a monastery, established in the seventeenth century, when this was the frontier, and on more than one occasion ambassadors were sent here by the Russians to treat with the neighbouring tribes. The passage of the lake usually occupies nine to ten hours, and on the west side dark cliffs rise from the water's edge and present a very grand appearance. It was only to this lake that the great traveller Atkinson went, though the title of his book on the River Amoor would have led one to suppose otherwise.

Quitting the lake the road for 40 miles follows the course of the River Angara, which finds its way out of the lake through an opening in the mountains, and we arrive at Irkutsk, the capital of Siberia, and a town of great importance. Viewed from the elevated ground where the cemetery lies, the town, covering a very extended area, has quite a gay appearance, as the roofs of the houses are red, while the domes and spires of more than a dozen churches are coloured green or white. The streets are wide, with many good shops, and although the houses are mostly constructed of wood, they contain all the comforts and luxuries of Western civilisation, as many of the residents are here against their own will. Droshkys ply for hire, as in Moscow and St. Petersburg, and, as most erroneous notions appear prevalent in England respecting Siberia, we may add, that ladies may be seen shopping attired in the latest Paris fashions, the most remarkable of which to a person arriving from the East appeared to be *chignons*, and bonnets hardly worthy of the name.

From Irkutsk the thoroughly organised system of posting enables the traveller to reach Russia Proper without further *désagrémens* than those incidental to a land journey of four thousand miles.

7.—*Earthquake in the Cachar Hills. Extracts from Letters from Captain GODWIN-AUSTEN.*

"Camp Apalos, 14 Jan., 1869.

"I MUST now give you a short account of an earthquake we have had here, and such as I do not care ever to experience again. It took place on the afternoon of the 10th. I had been working in the office-tent during the day, and on its getting chilly, about half-past four, I shut up, and went into the sleeping-tent for my choga, before going outside with the telescope, which required cleaning; while stooping to take the choga from the bedding, I heard call out, 'An earthquake! an earthquake!' I left the choga and ran out; I had not then felt it myself, but by the time I had got outside the ropes, there was no mistaking the fact, for the ground was beginning to rise and fall tremendously, and at last became so bad that it was with difficulty I could keep my feet. —'s children were sitting on the ground, all crying, and this, with the shouting of the servants, and the kicking of the ponies, &c., prevented my hearing any particular sound, save the crashing of the large forest trees that are near our camp; these were tossed about in the wildest way, and one very large one close by came down.

"The motion, in addition to the waves that passed by, consisted of a jerking or shaking. Everything upon tables or chairs was thrown off, no two-storied, or even one-storied house of brick could have stood it; here where the houses